

Every engineer has the challenge of inventing and/or designing things that will improve our way of life. Architectural Engineers have the fun task of making peoples dreams come true by designing new homes or renovating old ones. Chemical Engineers try to discover new and innovative ways of using chemicals to better our lives. Electrical Engineers could be challenged to design a way to supply power and electricity to millions of people day in and day out. In each of these cases the engineers must make sure that the designs that they decide on, can be built, executed, or utilized correctly by the people who are going to use them. They also must try to make the solution be as efficient as possible, thereby wasting the least amount of time, energy, and resources.

If an Architectural Engineer makes a mistake on a blueprint, the Engineering Firm risks the chance of being fined by the construction company for each mistake they make. Each mistake on a construction project usually results in a lot of wasted time resources, and money. Imagine if an Electrical or Civil Engineer makes a critical mistake on the design of a city's electrical system. Millions of people could be out of power for a long time, resulting in not only loss of money, but safety issues as well.

We're going to see how design accuracy is sometimes taken for granted.

THE CHALLENGE:

Skippy's Sandwich Co. has hired your Engineering Firm to develop a plan to make a sandwich as efficiently as possible. Your only task is to design the directions needed to make a sandwich. A "construction" company will take over from there and do all of the constructing.

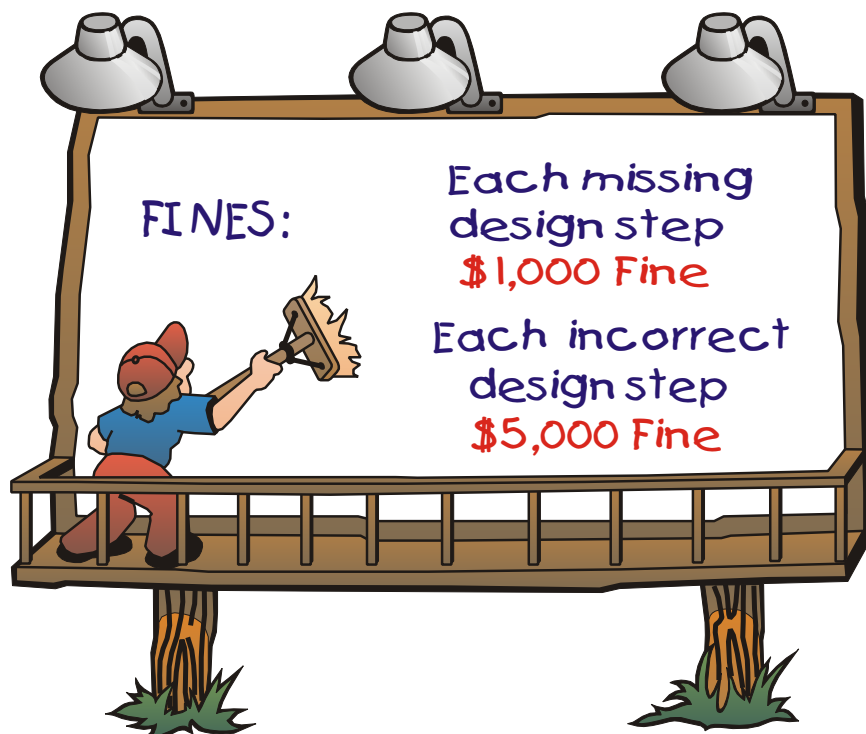
Each team will get a chance to design a technique for making a sandwich using only the materials provided. The fewer steps it takes to complete the task the lower the construction costs will be. Only one task may be described for each step in the process. (For instance, picking up a knife is one step in the process) The catch is, once you are finished, you will switch directions with another group. The other group will then have to follow the directions exactly as written to make the sandwich. The "construction" team cannot, in any way, take anything for granted and therefore must do exactly what is written. Each time a team is forced to take something for granted, a "fine" will be given. Each fine deducts money from the team's total profits.

DIRECTIONS:

Divide into groups of 3 to form 6 different "Engineering Firm" companies. Your first task is to make up a name for your Firm and write that name at the top of the design worksheet. Look at the list of materials and ingredients you will be using. Take the time to engineer the steps to correctly make a sandwich. Use scrap paper for all brainstorming. Use the worksheet to write the final draft of your directions. Only one command can be given at each step. Remember don't take anything for granted!

Materials

- Napkins
- 2 knives
- 1 loaf of bread
- jar of peanut butter
- 1 jar of jelly
- 1 container of Fluff™
- 1 cost accounting worksheet



SCORING:

Each Engineering Firm will start with \$500,000 that they received from Skippy's Sandwich Company for completing the design task. Each time the construction team has to make a construction move they will deduct \$1,000 from your account. Each time a construction team has to take a step for "granted" (some direction is missing or wrong) the Engineering Firm will be fined \$5,000. Once the construction process has been completed, the total construction costs and fines will be added up and deducted from the profits. The Engineering Firm with the most profits wins the challenge. And oh yeah, did I mention that the loosing teams have to make lunch for the winning teams? ENJOY!

Engineering Firm Name:_____.

Student Name:_____.

Student Name:_____.

Student Name:_____.

Write directions for the sandwich circled below

P B & Jelly P B & Fluff

Construction Steps:

- 1 _____.
- 2 _____.
- 3 _____.
- 4 _____.
- 5 _____.
- 6 _____.
- 7 _____.
- 8 _____.
- 9 _____.
- 10 _____.
- 11 _____.
- 12 _____.
- 13 _____.
- 14 _____.
- 15 _____.
- 16 _____.
- 17 _____.
- 18 _____.
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- 21 _____.
- 22 _____.
- 23 _____.
- 24 _____.
- 25 _____.
- 26 _____.
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- 28 _____.
- 29 _____.
- 30 _____.
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- 33 _____.
- 34 _____.
- 35 _____.
- 36 _____.
- 37 _____.
- 38 _____.
- 39 _____.
- 40 _____.



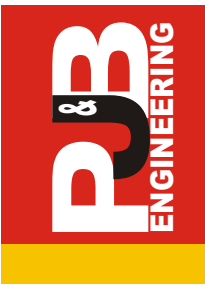
YOUR ENGINEERING FIRM NAME: _____

ENGINEERING DESIGN FIRM (who made the directions):

STUDENT: _____

STUDENT: _____

STUDENT: _____



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EXPENSE REPORT

FINES		
STEP #	EXPLANATION	CHARGE
TOTAL FINES ASSESSED:		

EXPENSE SUMMARY	
DESCRIPTION	TOTAL
Total number of steps	<input type="text"/>
	X \$1,000
(Total construction costs)	= <input type="text"/>
Total fines assessed	+ <input type="text"/>
(Total Expenses)	= <input type="text"/>

Each Fine = \$5,000

STARTING SALARY: \$500,000

TOTAL EXPENSES: -

TOTAL PROFIT:

TOTAL PROFIT MARGIN

